

**MORTALITY AND REPRODUCTIVE
EFFECTS OF INGESTED TRACER®
ON ADULT BOLLWORM
J. D. Lopez, Jr. and M. A. Latheef
USDA-ARS-APMRU, SPA, SCRL
College Station, TX**

Abstract

Tracer® (Spinosad) was evaluated in the laboratory for its potential use as a toxicant or biologically-active material when combined with a feeding stimulant for adult control of bollworm, *Helicoverpa zea* (Boddie) using a feeding-based approach. Tracer when mixed with sucrose (1.0 and 2.5 M) or fructose (2.0 and 5.0 M) solutions (ppm ai wt:vol) was evaluated for effects on feeding response, mortality, lethal concentration (LC) and lethal time (LT) of sex pheromone trap-captured males. Sublethal Tracer concentrations in 2.5 M sucrose were then fed to laboratory-reared females which were paired with untreated males and the effect on mating frequency, fecundity, larval hatch, and development of larvae to pupation were determined at 1, 10, 100, 1000, and 10,000 ppm concentrations. Tracer did not significantly reduce compared to control (sugar alone) the percentage of males that extended their proboscis when the front tarsi contacted the test solutions regardless of sugar or sugar concentration. Males ingested similar amounts of Tracer at 1, 10, and 100 ppm concentrations compared to control. At 1,000 ppm in 5.0 M fructose only and at 10,000 ppm in 1.0 M sucrose and both 2.0 and 5.0 fructose, there was a significant reduction in the amount of Tracer ingested compared to control. It is likely that this inhibition of amount ingested was related to the toxic effects of Tracer on the males. Toxicity of Tracer to males was comparable to the most toxic insecticides that have been evaluated previously including methomyl, thiodicarb, cyfluthrin and lambda cyhalothrin. The calculated 24 h LC₅₀ of 4.96 ppm was significantly higher than the 48 h LC₅₀ based on the lack of overlap in the 95% confidence limits, indicating that Tracer is relatively slow-acting. LTs varied from 5.3 h at 73 ppm (1 x LC₉₉) to 1.7 h at 7300 ppm (100 x LC₉₉). At sublethal concentrations of 0.05, 0.1, 0.25, 0.5 and 1.0 ppm, Tracer had no significant reductive effect compared to control in the amount ingested, mating frequency (number of spermatophores per female), number of eggs oviposited per female over 3 days, and development of hatched larvae to the pupal stage (%). Tracer did significantly reduce larval hatch from eggs oviposited in a concentration-dependent manner from a mean of 85% in the control to 8% for 1 ppm. It was observed that at the higher concentrations, females oviposited abnormally in clumps.

These results indicate that Tracer has high potential for use in adult bollworm control because it did not inhibit feeding response at lethal concentrations, was highly toxic, and greatly reduced larval hatch of eggs oviposited.

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